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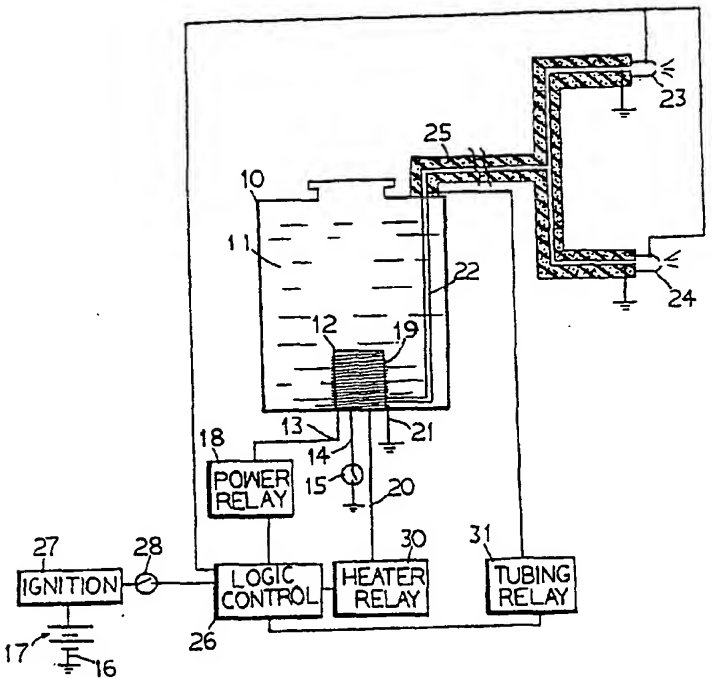
(54) **LAVE-VITRE POUR AUTOMOBILE**
(54) **AUTOMOBILE WINDSHIELD WASHER SYSTEM**




(57) Cette invention concerne un dispositif lave-glace d'automobile dont la pompe à eau se trouve dans le réservoir de liquide lave-glace qui est équipé d'un élément chauffant servant à réchauffer et la pompe et le liquide lave-glace. Le tube d'amenée de liquide aux gicleurs est en alliage à effet Joule que l'on met sous tension pour réchauffer le liquide présent dans le tube. Une commande électronique maintient le tube sous tension selon un cycle prédéterminé, asservi à des capteurs de température montés sur les gicleurs.

(57) In this windshield washer system for an automobile, the water pump is located in the washer fluid reservoir. A heater is provided at the pump which heats the pump as well as the washer fluid. The tubing conducting the fluid to the spray nozzles is made of a heating alloy which may be energized to heat the fluid in the tubing. A logic control maintains the system energized in predetermined operating cycles. The control is also operated by a feedback signal from a temperature sensor located at the spray nozzles.

ABSTRACT OF THE DISCLOSURE

In this windshield washer system for an automobile, the water pump is located in the washer fluid reservoir. A heater is provided at the pump which heats the pump as well as the washer fluid. The tubing conducting the fluid to the spray nozzles is made of a heating alloy which may be energized to heat the fluid in the tubing. A logic control maintains the system energized in predetermined operating cycles. The control is also operated by a feedback signal from a temperature sensor located at the spray nozzles.

In the windshield washer system provided in automobiles, a pump is commonly mounted adjacent to the washer fluid reservoir which may be energized to pump the fluid in the reservoir through conducting tubing to spray nozzles located in front of the windshield. The fluid is thus sprayed onto the windshield for cleaning the latter. In order to prevent the fluid in the reservoir and in the conducting tubing from freezing during the cold winter months when the outdoor temperature dips below the freezing point of water it is necessary to add chemicals such as alcohol and other substances into the water in the washer reservoir so as to lower its freezing point to considerably lower than zero degree centigrade. Such additives often inherently cause the deterioration of the pump and the painted surface of the automobile, resulting in the shortening of the life of the pump and the occurrence of irreversible damage to the paint of the automobile. The damage is even more severe with the use of some commercially available pre-mixed washer fluids which may contain strong chemicals; and furthermore, they also inherently increase the general operating cost of the automobile. More often due to the neglect or forgetfulness of the automobile owner the additives have not been mixed into the water in the reservoir, or due to an insufficient amount of mixture has been used, the fluid becomes frozen in the winter months rendering the washer system inoperative. The breakdown of the windshield washer system is dangerous to the automobile occupants since the driver would not be able to clean

the windshield to obtain a clear vision of the road way.

Moreover, the use of chemical additives in the windshield washer would contribute to the pollution of the environment when such additive is ultimately dispersed into the atmosphere.

It is the principal object of the present invention to provide an automobile windshield washer system which operates effectively in the cold winter months.

It is another object of the present invention to provide a windshield washer system which may be operated with water without having to mix additives into the water.

Briefly, the windshield washer system of the present invention comprises of providing an immersible pump in the water reservoir. A heater is mounted at the pump, which may be operated to heat both the pump and the water in the reservoir. The conducting tubing delivering the water from the reservoir to the spray nozzles are made of electrically operative heating alloys. Thus, the tubing may be energized to heat the water passing therethrough.

Other objects and advantages of the present invention will become apparent from the following detailed description of the preferred embodiments thereof in connection with the accompanying drawings, in which

Figure 1 is a schematic diagram showing the components of the windshield washer system of the present invention.

Figure 2 is a cross section enlarged isolated view of the

water conducting tubing having insulation provided thereon.

With reference to the drawings wherein like reference numerals designate the same parts in the various views, the washer system comprises a water reservoir 10 for holding the water 11 for washing the automobile windshield. A submersible water pump 12 is mounted in the water reservoir 10. The water pump 12 is preferably mounted at the center of the bottom panel inside the reservoir 10. The reason for mounting the water pump 12 at such preferred location will become apparent in the following description. The electrical connection positive lead 13 and negative lead 14 may extend through the bottom panel of the reservoir 10 for making electrical connections to the water pump 12. As shown in the drawing, the negative lead 14 is connected through a manually operated momentary switch 15 to the chassis of the automobile which is connected to the negative terminal 16 of the automobile battery 17. The positive lead 13 is connected to a power relay 18.

A heater 19 is mounted at the submersible pump. The heater 19 may be a heating wire wound over the pump body. The electrical connection positive lead 20 and negative lead 21 of the heater may also extend outside of the water reservoir 10 through the bottom of the latter. The negative lead 21 of the heater is connected to the negative terminal 16 of the automobile battery 17 by connecting conveniently to the chassis of the automobile.

A water conducting tubing 22 delivers the water 11 from the reservoir 10 to spray nozzles 23 and 24 located adjacent to the

windshield of the automobile such that the cleaning water under pressure will be sprayed onto the windshield for cleaning the latter. The water conducting tubing 22 is made of an electrically operative heating alloy such as nichrome. All portions of the water conducting tubing 22 located external to the water reservoir 10 and extending from the water reservoir 10 to the spray nozzles 23 and 24 are covered by a thermal insulation outer covering 25 so as to prevent the tubing from being damaged by the water freezing in the tubing 22 in the cold winter time particularly when the automobile is not in operation.

The operation of the pump 12, the heater 19, and the conducting tubing 22 is governed by a logic control circuit 26 which is connected to the battery supply 16 through the ignition 27 and a system power switch 28. The logic control circuit 26 is connected to the pump relay 18 through connection line 29, and it is connected to the heater 18 through a one-minute timer relay 30, and it is also connected to the conducting tubing 22 through a half-minute timer relay 31. The operation of the logic control circuit 26 is also dependent on the feedback signal from temperature sensors provided at the spray nozzles 23 and 24.

The washer system of the present invention is actuated by energized by operating the system power switch 28 after the ignition 27 of the automobile has been turned on and the engine is operating. The temperature sensors at the spray nozzles 23 and 24 send a signal to the control logic circuit 26 that the temperature

from the spray nozzles.

While the preferred embodiments of the invention have been described above, it will be recognized and understood that various modifications may be made therein and the appended claims are intended to cover all such modifications which may fall within the spirit and scope of the invention.

The embodiments of the invention in which an exclusive property and privilege is claimed are defined as follows:

1. An automobile windshield washer system comprising,

a reservoir operative for holding a fluid for washing the windshield,

a submersible water pump member located within said reservoir,

a heater member mounted on said pump member and being operative for heating said fluid to a predetermined temperature level,

a water conducting tubing member connected to said water pump member and to spray nozzles located adjacent to said windshield, said water conducting tubing member being operative for heating the fluid therein.

2. An automobile windshield washer system according to Claim 1 wherein said water conducting tubing member is made of a material operative electrically to produce heat.

3. An automobile windshield washer system according to Claim 2 wherein said material is a nichrome alloy.

4. An automobile windshield washer system according to Claim 2 including a logic circuit coupled to said heater member and to said water conducting tubing member and being operative to control the operation of said heater member and said water conducting member, temperature sensor means mounted at said spray nozzles, said temperature sensor means being electrically connected to said logic circuit and being operative to actuate and de-actuate said logic

circuit according to temperature conditions at said spray nozzles.

5. An automobile windshield washer system according to Claim 4 including thermal insulation covering provided over a portion of said water conducting tubing member extending from said reservoir to said spray nozzles.

6. An automobile windshield washer system comprising,

a cleaning fluid container mounted in said automobile,

a submersible water pump member disposed at a bottom center location within said container,

a heater mounted at said pump member,

an elongated fluid conducting tubing having one end connected to said pump member and being operative to convey said fluid being drawn by said pump member, said fluid conducting tubing being made of an electrically resistive alloy electrically operative to produce heat therein,

spray nozzle means mounted to the other end of said elongated fluid conducting tubing, said spray nozzle means being located adjacent to said windshield,

a logic control circuit coupled to said pump member, said heater, and said fluid conducting tubing, and being operative to energize electrically said pump member, said heater and said fluid conducting tubing.

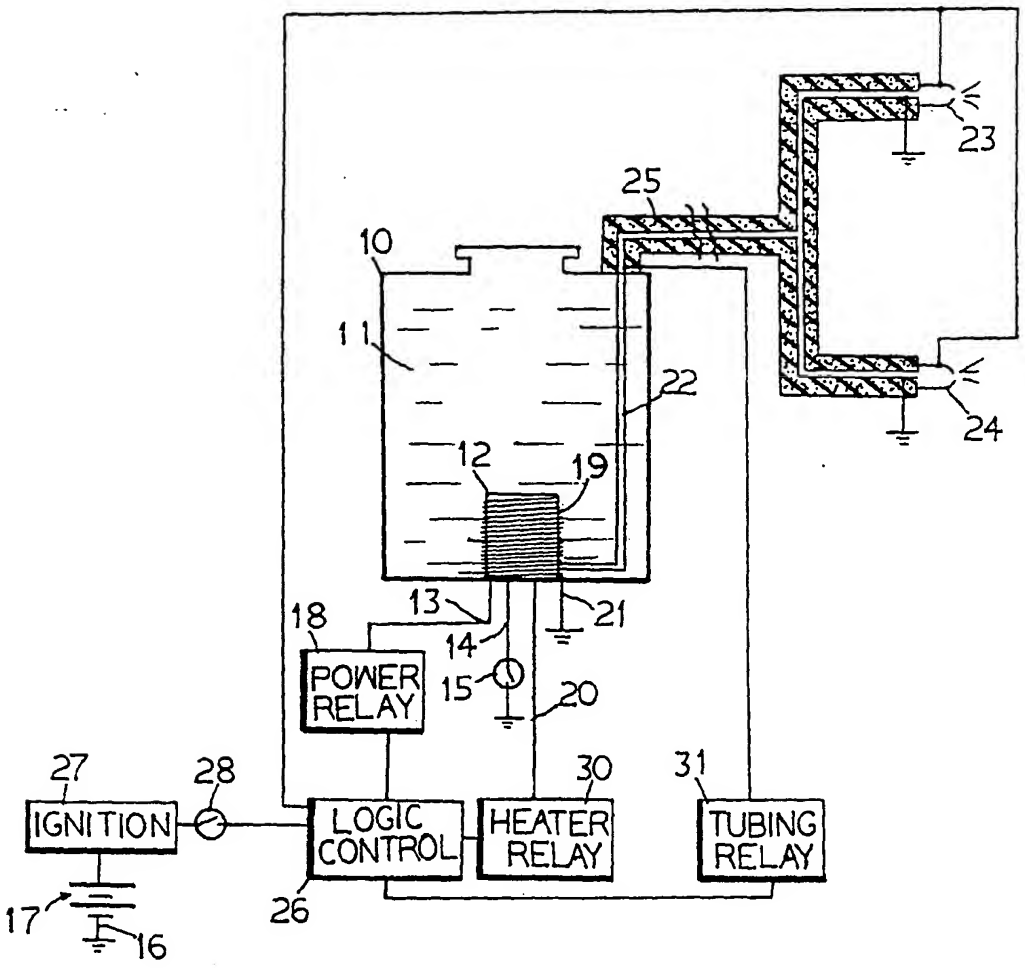
7. An automobile windshield washer system according to Claim 6 including thermal insulation covering mounted over portions of said fluid conducting tubing extending from said fluid container to said

spray nozzles.

8. An automobile windshield washer system according to Claim 7 including temperature sensor members mounted at said spray nozzles and being connected to said logic control circuit, said temperature sensor members being operative according to temperature conditions a said spray nozzles to actuate and to de-actuate said logic control circuit.

9. An automobile windshield washer system according to Claim 8 wherein said heater is an electrical heating wire wound on said pump member.

10. An automobile windshield washer system according to Claim 9 including a first relay connected to said logic control circuit and to said pump member, a second relay connected to said heater and to said logic control circuit, and a third relay connected to said fluid conducting tubing and to said logic control circuit.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POWER RELAY
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IGNITION
LOGIC CONTROL
HEATER RELAY
TUBING RELAY
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16
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Fig. 1.

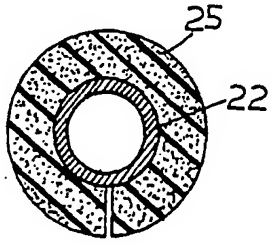
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Fig. 2.